

On the Existence of Periodic Solutions of a Three-Patch Diffusion Predator-Prey System

Mohammed Ismail^a, Atta A. K. Abu Hany^b, and Aysha Agha^c

^a Department of Mathematics, Faculty of Science, Al-Azhar University, Nasr City (11884), Cairo, Egypt

^b Department of Mathematics, Faculty of Science, Al Azhar University of Gaza, Gaza, Via Israel

^c Department of Mathematics, Faculty of Science, Al Aqsq University of Gaza, Via Israel

Reprint requests to Atta Hany; E-mail: attahany@yahoo.com

Z. Naturforsch. **64a**, 405 – 410 (2009); received March 18, 2008 / revised August 19, 2008

We establish a mathematical model for the three-patch diffusion predator-prey system with time delays. The theory of Hopf bifurcation is implemented, choosing the time delay parameter as a bifurcation parameter. We present the condition for the existence of a periodic orbit of the Hopf-type from the positive equilibrium.

Key words: Predator-Prey Model; Time Delay; Diffusion; Hopf Bifurcation; Periodic Solutions.